Maine Transportation Safety Trends

Reporting of

Maine Ten-Year Crash Trends

and the

MDOT Highway Safety Improvement Program

For the Period Ending
December 31, 1999

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Executive Summary

The economic impact of road crashes in Maine is very significant. In 1999, over 39,000 crashes involving approximately 95,000 people occurred on Maine's 22,500 miles of public roads. These motor vehicle collisions resulted in 175 fatalities, over 7,500 known injuries, and more than 8,700 possible injuries[1]. The estimated economic loss to Maine resulting solely from property damage and medical costs is over $1 billion per year[2]. The lost time, productivity and lost wages have immeasurable impact to family and friends.

There has been a marked reduction in the fatal crash rate (down 31%) and overall crash rate (down 12%).

Some positive crash trends are occurring in Maine. The total number of crashes, fatalities and injuries has remained relatively stable over the past three years. However, vehicle miles of travel continue to increase. As a result, total crash costs, crash rates and fatality rates all continue to decline.

Although there have been general improvements in a number of crash areas, Maine continues to rank high in Utility Pole (#7) and Work Zone fatality rates. This annual report assesses some of the major trends and discusses the corrective approaches currently being taken.

Ten-year trend analyses are included to indicate the general status of highway safety in Maine, and to identify areas that may require increased focus. Specific findings of this report include the following highlights:

- From 1990 through 1999 there has been a marked reduction in the fatal crash rate (down 31%). Additionally, the overall crash rate is down 12%. These improvements are likely due to a combination of safer roads in Maine and increased automobile safety equipment such as anti-lock brakes, additional structural protection in passenger compartments, seat belts and driver and passenger airbags. The improving economy of the 1990's brought additional personal and commercial traffic and that has resulted in slowing and in some cases reversing the improving crash reduction trend.

- Motorcycle crashes are down 30%, and Head On, Pedestrian and Bicycle crashes have all shown improvement.

[1] Maine TIDE, Maine Department of Transportation.

[2] "Motor Vehicle Accident Costs", FHWA Technical advisory T-7570.2, 10/31/94.

- Some types of crashes have increased by more than 5% over the last ten-year period, however. These include: Rear End and Large Animals (especially moose) as well as crashes involving Commercial Vehicles.

- Run Off Road crashes result in the greatest number of fatalities and injuries over the ten-year period compared to all other crash types:

  - **Run Off Road (85,431 crashes, 758 fatalities);**
  - **Head On (21,294 crashes, 477 fatalities);**
  - **Intersection Movement (81,455 crashes, 207 fatalities);**
  - **Pedestrian (3,311 crashes, 158 fatalities);**
  - **Rear End (119,656 crashes, 103 fatalities);**
  - **Rollover (5,233 crashes, 63 fatalities);**
  - **Object in Road (12,199 crashes, 44 fatalities);**
  - **Bike (3,088 crashes, 26 fatalities);**
  - **Animals (39,203 crashes, 24 fatalities);**
  - **Submersion (57 crashes, 4 fatalities);**
  - **Train (95 crashes, 3 fatalities);**
  - **Fire (2,190 crashes, 1 fatality);**
  - **Jackknife (475 crashes, 0 fatalities);**
  - **Rock Thrown (188 crashes, 0 fatalities);**
  - **Other (5,428 crashes, 21 fatalities); and**
  - **Unknown (45 crashes, 0 fatalities).**

The number of crashes has increased for Rear End and with Large Animals (especially moose) during the last 10 years, as have crashes involving Commercial Vehicles.

This report also summarizes the effectiveness of the projects that have been undertaken through the MDOT Highway Safety Improvement Program (HSIP) in recent years. The HSIP funds capital improvements intended to reduce the number and severity of crashes that occur on Maine's public roads. The HSIP addresses two specific transportation safety areas:

- The Hazard Elimination Program addresses general road safety problems; and
- The Grade Crossing Improvement Program addresses railroad grade crossing safety problems at public roads.

Current funding for the HSIP in Maine is about $5 million per biennium for the Hazard Elimination Program (HEP) and $1.8 million per biennium for the Rail Grade Crossing Improvement Program (GCIP). As required by Federal law, at least one-half of the GCIP funds are expended on grade crossing signal improvements.

Hazard Elimination Program project locations for the 1994 -1996 period have yielded a:

- 35% reduction in crashes
- 73% reduction in crash economic impact from the period three years prior to construction to the three year post-construction period
- Benefit-to-cost ratio of 6.4

Hazard Elimination Program project locations have yielded a 35% reduction in crashes and a 73% reduction in crash economic impact.

These findings indicate that the Hazard Elimination Program is effective in reducing the number and severity of crashes in Maine. Additional attention may need to be focused to address Run Off Road, Head On, Rear End, Work Zone, Pedestrian, Intersection Movement crashes and Crashes with Animals, as they generate the greatest number of fatalities and/or are developing an upward trend.

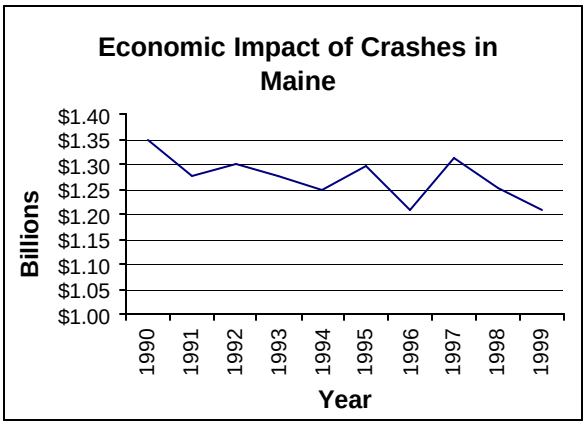
Additional studies will be performed to identify causative factors. These studies will enable MDOT to better define the types and extent of transportation safety problems in Maine, and they will help determine appropriate countermeasures to employ.

An additional study will also be conducted to measure the overall effectiveness of each type of safety project utilized in recent years. The information obtained will be used to assess the potential benefits of future proposed safety improvement projects.

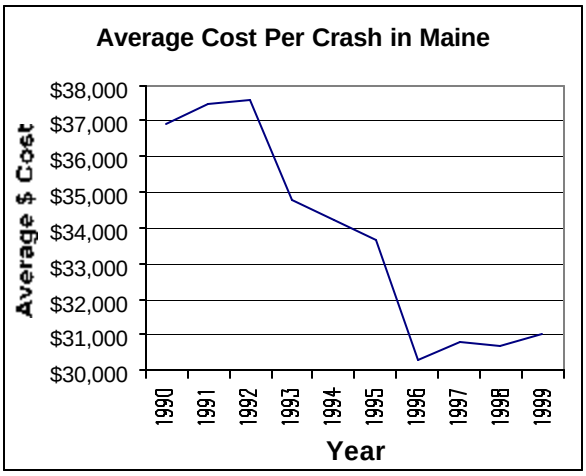
Much of the data contained in this report is developed from MDOT's Transportation Information Decision Enhancement Database (TIDE). TIDE provides detailed information about Maine's road system and crash activity. Custom queries can be developed to evaluate crash type, contributing factors, driver physical condition, date/time, road and other aspects of crashes occurring on all public roads. Crash information can also be spatially mapped to give the user an at-a-glance look at crash problem locations. An example of this is the Crashes Involving Moose map included at the end of this report.

Introduction

Motor vehicle crashes affect nearly every Maine resident, either personally or financially through insurance premiums. The personal and economic impact of road crashes in Maine is very significant. In 1999, over 39,000 crashes involving approximately 95,000 people occurred on Maine's 22,500 miles of public roads. These motor vehicle collisions resulted in 175 fatalities, over 7,500 known injuries and over 8,700 possible injuries[3]. The estimated economic loss[4] to Maine is $1.24 billion per year. The emotional impact to affected families and friends is immeasurable.



In Maine both the cumulative cost of crashes and the average cost per crash have been on a general downward trend. **Over the past ten years the annual economic impact to the state has dropped nearly $139 million or 10.3%.** Over the same period the average cost per crash, which is an indicator of crash severity**, has dropped nearly $6,200 or 17%.**

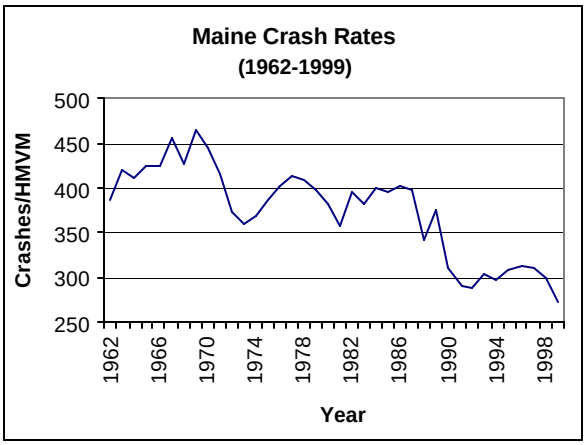


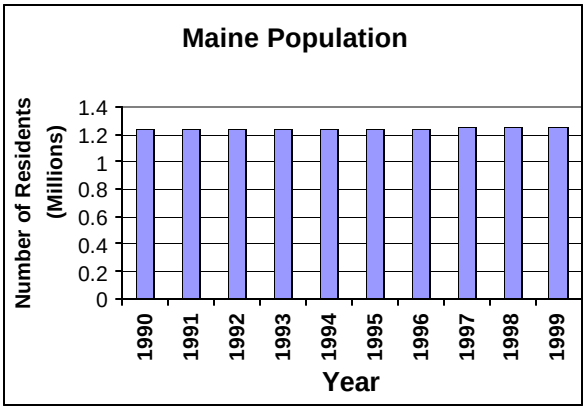
Motor vehicle collisions are not "accidents". They all are caused either individually or by any combination of vehicle, human, or road elements. Many motor vehicle crashes occur due to driver error and therefore cannot be addressed through road safety improvements. However, road improvements can reduce the likelihood of a crash from occurring and may help reduce the severity of the crashes that do occur, regardless of their cause.

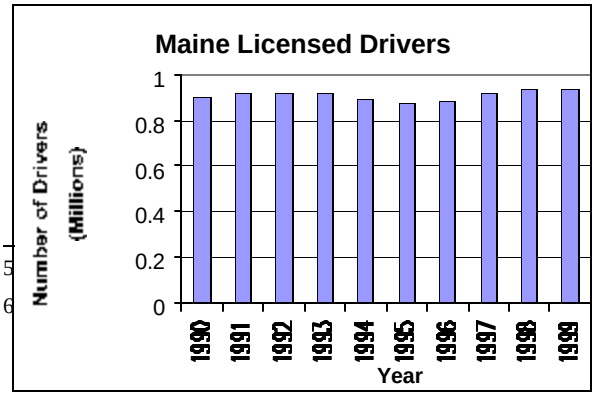
[3] "Maine Highway Crash Facts 1996", Maine Department of Transportation.

[4] "Motor Vehicle Accident Costs", FHWA Technical advisory T-7570.2, 10/31/94.

The decreasing trend in cost per crash has leveled over the last four years. This trend will be monitored to determine if occupant protection improvements in newer vehicles is being offset by other factors, such as the mix of large and small vehicles on the road, higher speeds and other aggressive driving behaviors.



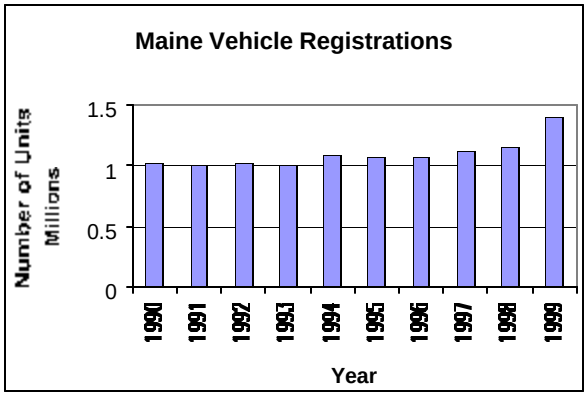




While the downward trends are noteworthy, capital improvements are still necessary to meet current safety standards.

Both population and the number of issued licenses have increased moderately in Maine, but vehicle registrations have grown faster over the last decade. The 1999 population of 1,253,040[5] is a 1.8% increase over 1990 while the current 933,278[6] licensed drivers is an increase of 3.4%. Registrations have increased by 38% over the same period.

The vehicle miles of travel (shown in Hundred Million Vehicle Miles-HMVM) has grown at a greater rate than the population or licensed driver growth during this ten-year period, increasing by nearly 22%. This is likely a result of several factors including the strong economy of the 1990's, relative affordability of fuel, a strong tourist trade and continued urban sprawl.



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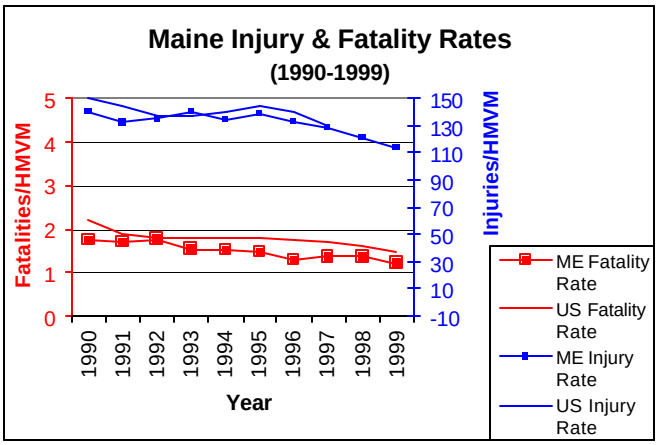
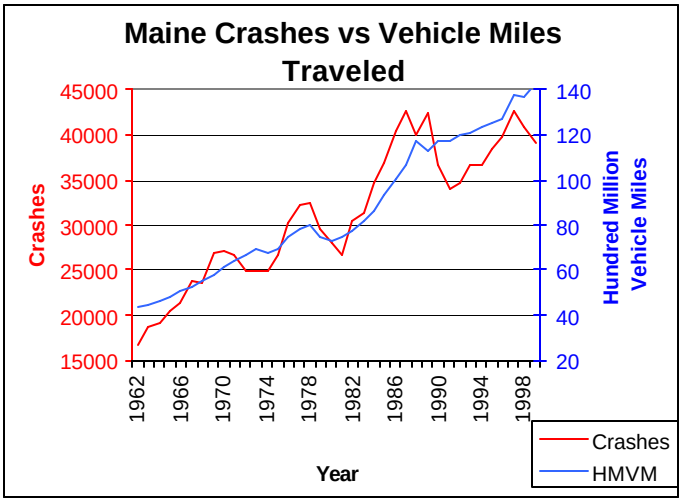


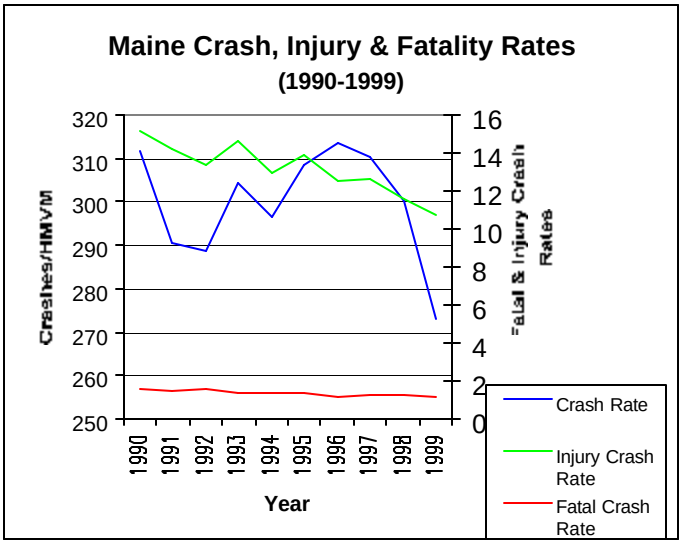
Maine compares favorably with national injury and fatality statistics. Overall fatality and injury trends both in the state and nationally are going down. Maine's injury rate is slightly below the national average. Maine's fatality rate has been about 20% under the national level. Preliminary national numbers for 1999 indicate the current fatality rate is 1.5 deaths/HMVM, still above Maine's rate of 1.2 fatalities/HMVM. Massachusetts has the low national fatality rate of 0.8 and Mississippi has the highest at 2.7.

Selected Crash Trends

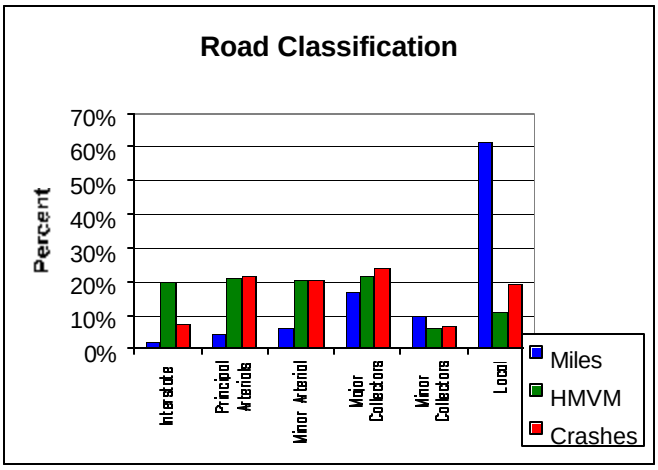
Crash data in Maine is currently collected at the scene of the crash by the investigating law enforcement officer, if the damage caused by the crash is greater than $1,000 (minimum reportable damage increased from $500 by the Maine Legislature, effective September 30, 1999), or if an injury or fatality occurs. This data collection is accomplished through utilization of the Uniform Police Crash Report (PCR). A supplemental form is included when commercial vehicles are involved.

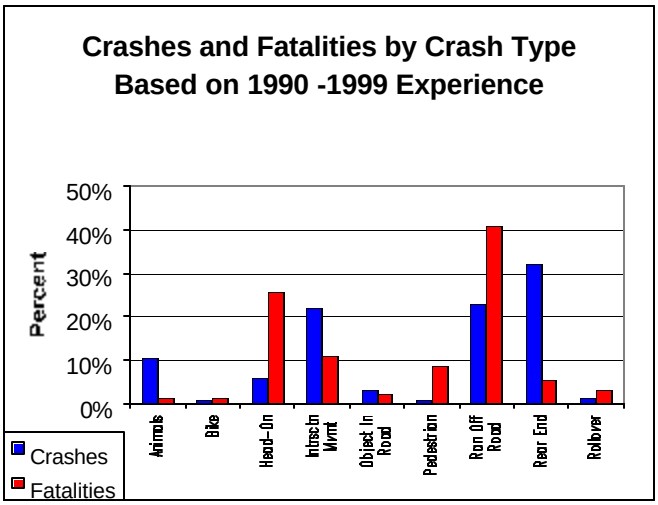


The number of crashes in Maine has decreased slightly over the last few years. This is occurring at the same time that vehicle miles of travel are increasing. Since 1991 the number of crashes has grown at a 6.7% rate while the rate of growth for vehicle miles traveled has been 21.8%. The data line for crashes is more erratic than the number of vehicle miles of travel. Crashes are subject to environmental conditions such as winter weather, while travel remains relatively unaffected. The number of vehicle miles of travel has shown steady growth since 1962 with only small peaks and valleys.



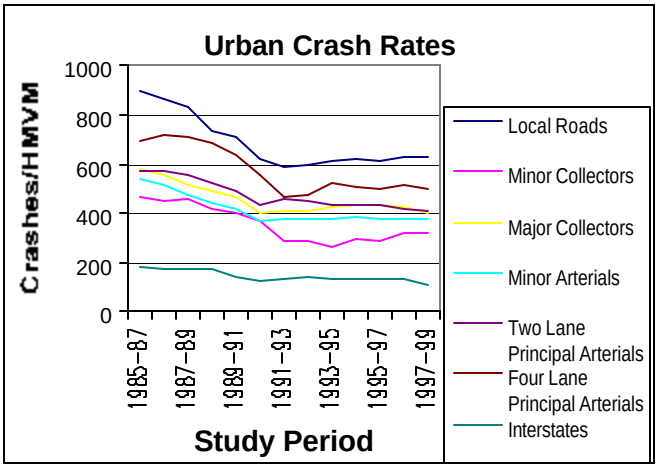
The fatal crash rate in Maine has shown a steady decline for the past ten years. The number of fatalities has decreased by over 15% from 1990 to 1999. During this time the fatal crash rate has dropped from nearly 1.8 fatal crashes/HMVM to slightly over 1.2. This represents nearly a 31% drop in the fatal crash rate. This drop is largely attributable to improvements in roadside safety, automobile safety and the use of safety belts.

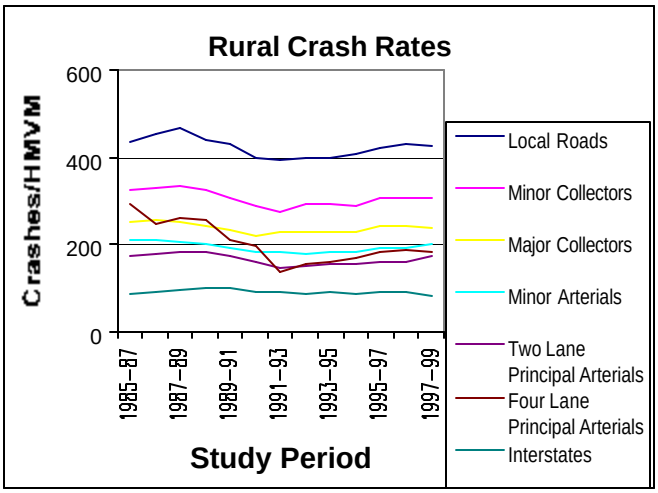




Over 85% of Maine's crashes are distributed evenly on Principal and Minor Arterials, Major Collectors, and Local Roads. It is interesting to note as shown in the adjacent graph that local roads make up 61% of the 22,500 miles of roadway in the state, 10% of the vehicle miles traveled, and 18.6% of the crashes. In contrast, Interstates comprise only 3.5% of the total miles, 21.5% of the vehicle miles traveled, and 7.1% of the crashes. As the road classification increases, the crash rate decreases.

The most common type of crash on Maine's roads is the Rear End crash. Over 119,000 Rear End crashes have occurred in the last ten years. This accounts for over 32% of all crashes. However, Rear End crashes are the least severe form of common crash types based on the ratio of fatal crashes to total crashes. Run Off Road crashes, on the other hand, account for the most fatal crashes and the second highest total number of crashes. Train crashes (not shown on this chart because of the few incidences) are the most severe type of crash based on the fatal crash to total crash ratio, but few crashes involving trains occur in Maine (no fatalities resulting from motor vehicle crashes with trains have occurred since late 1992).

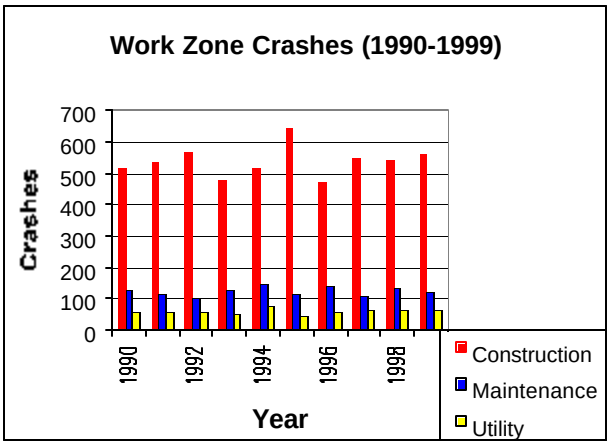




Crash rates in Maine's urban and rural settings both show the same general trends. Generally crash rate is indicative of road classification. The higher the road class the lower the crash rate. This is evident in Maine's data shown in the two adjacent graphs. A few exceptions can be noted in the urban graph; four lane principal arterials exhibit higher than expected crash rates and minor collectors show much lower crash rates than expected. In the rural graph the exception is still four lane principal arterials but the disparity is less.

From 1990 through 1999, fatal crash rates have dropped on most road classes. The only exception was on local roads where there was a 5% increase in fatal crashes. The drop was most significant for Major Collectors with the fatal crash rate down 46%. In addition, Principal Arterials, and Minor Arterials and Major Collectors each experienced a decrease of about 30%. The Interstate, which has the lowest fatal crash rate, dropped 10%. The fatal crash rates and the change in fatal crash rate over the ten-year review period are summarized in the following table.

Road Classification	1999 Fatal Crash Rate Crashes per HMVM	Ten Year Change
Interstate	0.46	-10%
Principal Arterials	1.14	-31%
Minor Arterials	1.27	-29%
Major Collectors	.98	-46%
Minor Collectors	1.83	-27%
Local Roads	2.27	+5%



Work zone crashes have shown a slight increase over the past 10 years. The majority of all work zone crashes occur in Construction work zones. This crash type puts workers in a very vulnerable position, and drivers are subject to injury as well. Work Zones account for an average of three fatalities and about 340 injuries annually. There is nearly a one out of three chance of a Work Zone crash resulting in one or more injuries or fatalities.

MDOT has supported several programs focusing on safety within Work Zones including flagger training, improved signage and additional physical protection for personnel. MDOT participates in the National Work Zone Safety Awareness Week campaign. MDOT will continue to concentrate on enhancing Work Zone safety by improving awareness and physical protection to benefit both those working in roadway areas as well as the traveling public.

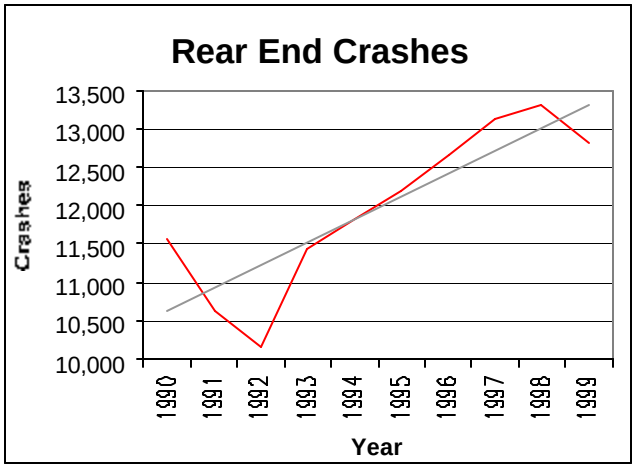
Trends for Specific Crash Types

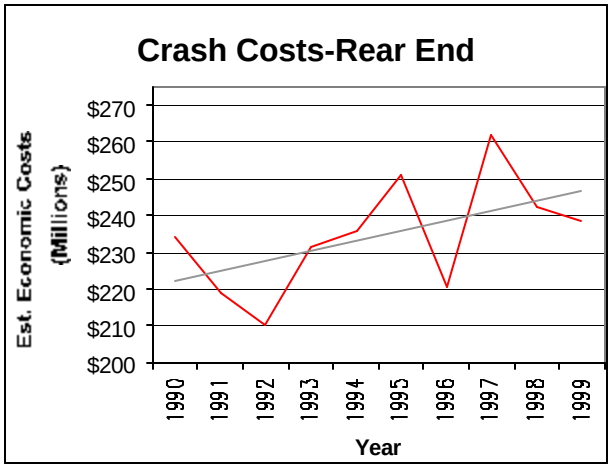
Ten-year trends for major crash types are charted on the following pages. The summary of the trends is shown in the table below. The ten-year average of crashes and estimated economic cost are shown below. Based on the trend lines established for each crash type, rates of changes for crashes and estimated cost are shown in the last two columns. The crash types are listed in order of average annual crashes.

Crash Type	**Ten-Year Avg. Annual # Of Crashes***	**Ten Year Avg. Annual Est. Cost (000's) ***	**Average Annual Rate of Crash Change****	**Average Annual Rate of Cost Change****
Rear End	11,967	234,386	+2.8%	+1.3%
Run Off Road	8,539	409,005	+0.9%	-0.7%
Intersection Movement	8,161	227,671	+0.2%	+1.2%
Animal	3,924	27,209	+15%	+8.8%
(*Moose -5 YR stats*)	668	15,468	+8.8%	-0.3%
Head On	2,137	205,857	-1.2%	-2%
Object in Road	1,219	32,431	+0.8%	-2.7%
Pedestrian	330	61,878	-2.3%	-2.2%
Bicycle	278	22,383	-1.6%	-4%
Other Crash Trends				
Commercial Vehicle	2,390	122,632	+0.5%	-0.8%
Motorcycle	510	79,720	-3.3%	-5.1%

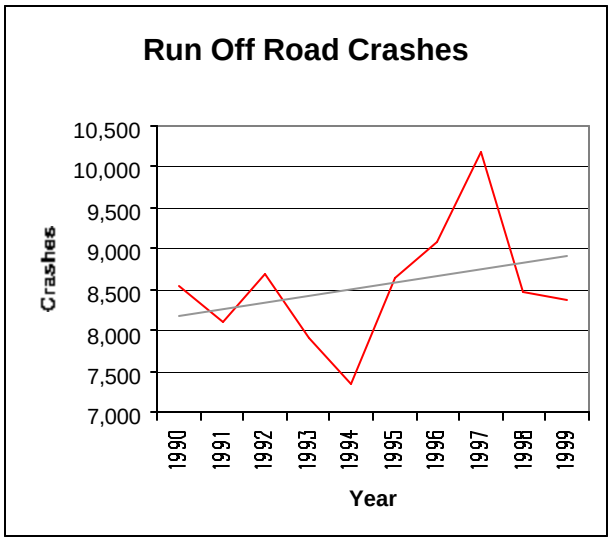
* Based on taking past ten year results and dividing by 10.
** Based on using estimated trend lines shown on the following charts.

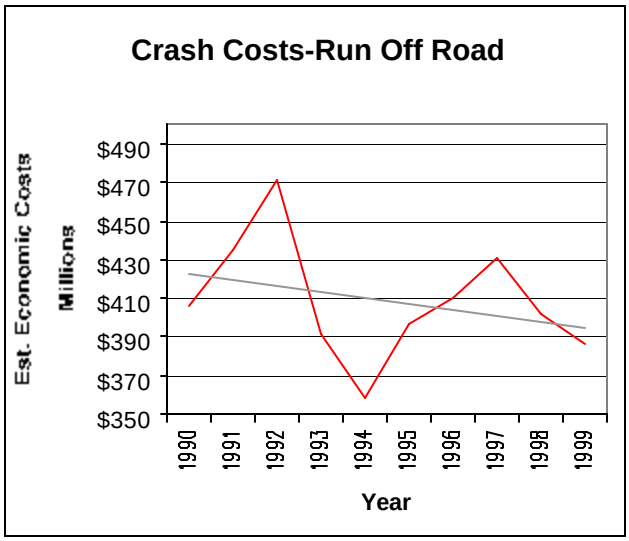
The following charts show 10-year trends for specific crash types. They are shown in order of crash type frequency with charts also done for special vehicle types (motorcycles and commercial vehicles). Actual annual crash experience is shown in red and estimated trends are shown as straight gray lines.



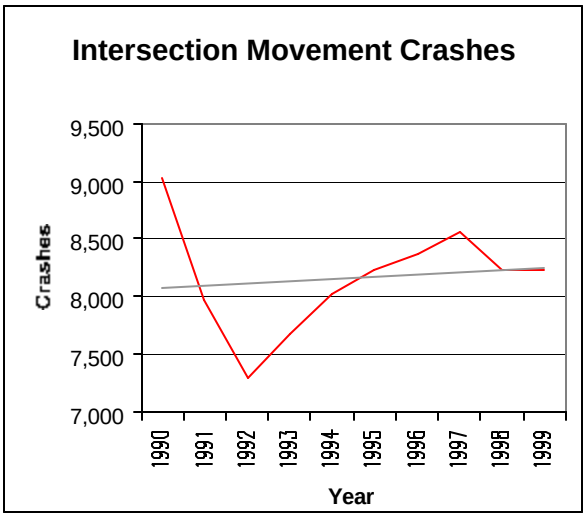


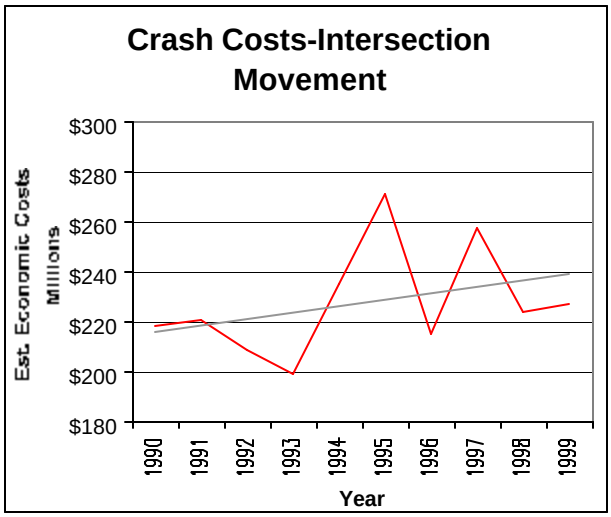
Rear End crashes have increased substantially since 1992.The most commonly cited factors are driver distraction, inattention and following too closely. Distractions could include such items as adjusting radios and CDs and cell phone use. Vehicle conveniences, poor driving practice (following too closely) and being preoccupied with other matters besides driving are the major causative factors.



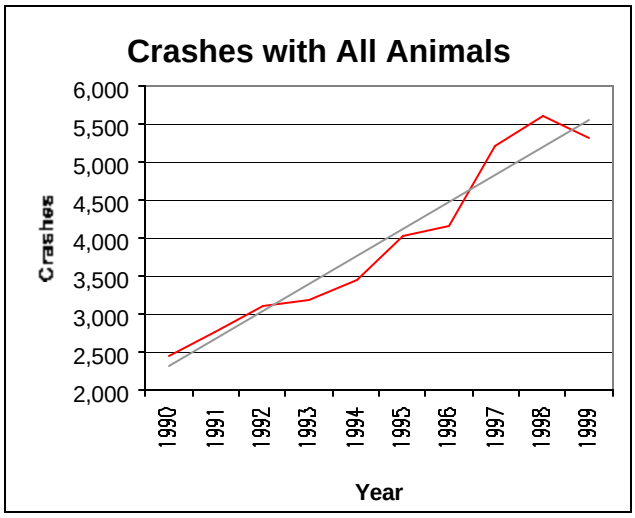


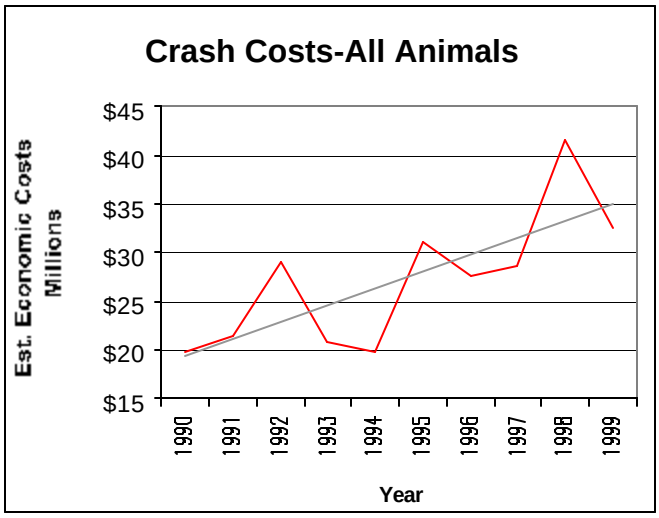
Run Off Road crashes generate the greatest number of fatalities. The number of annual incidents and their estimated economic costs has been cyclical over the last ten years, and has dropped back to about the ten-year average over the last two years. MDOT is currently evaluating these crash types and has already revised its utility pole location policy as a result. Additionally, MDOT is considering installing shoulder rumble strips on secondary roads as one of several methods to reduce the number of crashes.





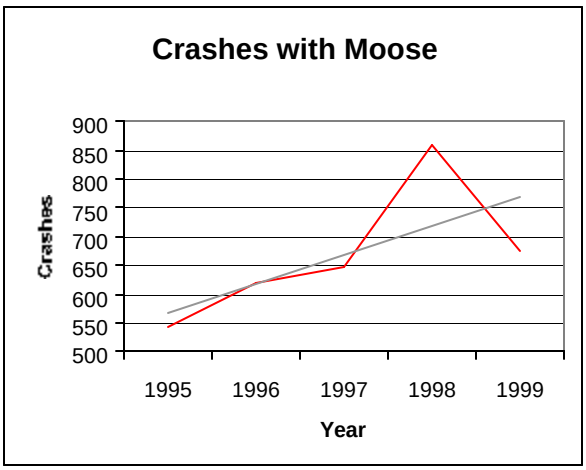
Intersection Movement crashes showed a rapid decline from 1990 through 1992, then increased through 1997, and appears to have leveled off recently. MDOT is currently involved in a pilot project using dynamic signs to warn motorists of oncoming traffic at stop-controlled locations exhibiting severe sight limitations. Intersection movement crash experience is up slightly in Maine for the last decade. However, national numbers show that intersection fatalities increased by 18% from 1992 through 1997 while the Maine rate increased 27% in this same time frame. The overall estimated economic cost trend is up slightly for the past decade.

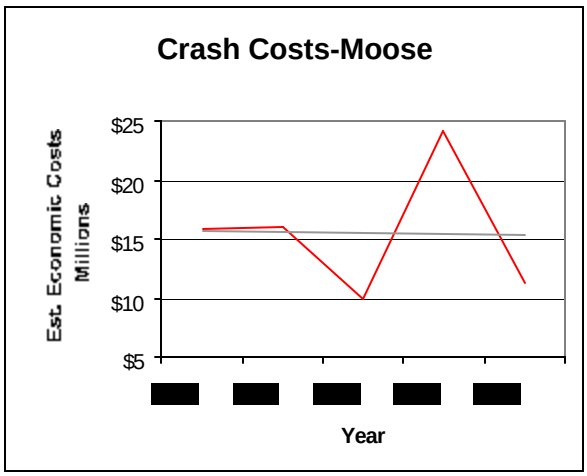




Crashes involving Animals have shown a significant steady increase during the last ten years, more than doubling during this period. The estimated economic costs have been more erratic when looked at from year to year, but have doubled from 1990 to 1998. This represents the greatest growth rate of any of the major crash types. The majority of crashes involving animals is with deer, but crashes involving moose are generally more severe.

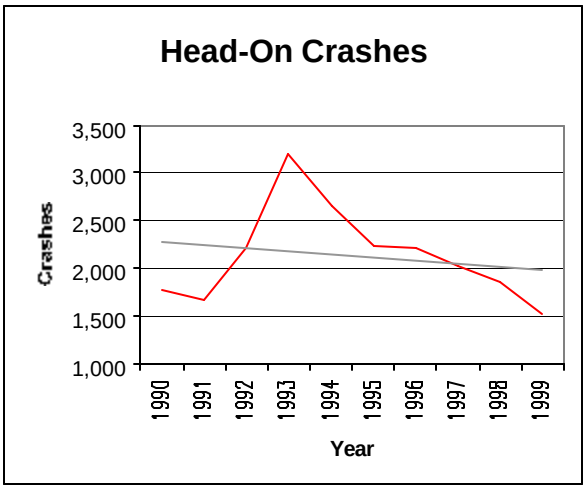
MDOT is currently working with a multi-agency task force to develop methods to reduce the number and severity of crashes involving large animals. These activities are currently targeted at moose crashes, due to the severity of that type of animal-vehicle crash.

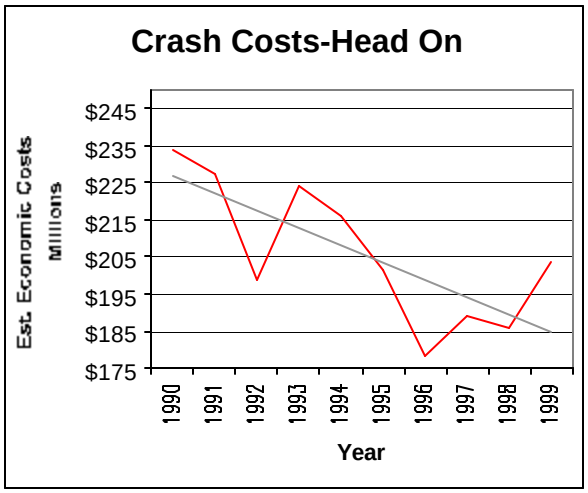




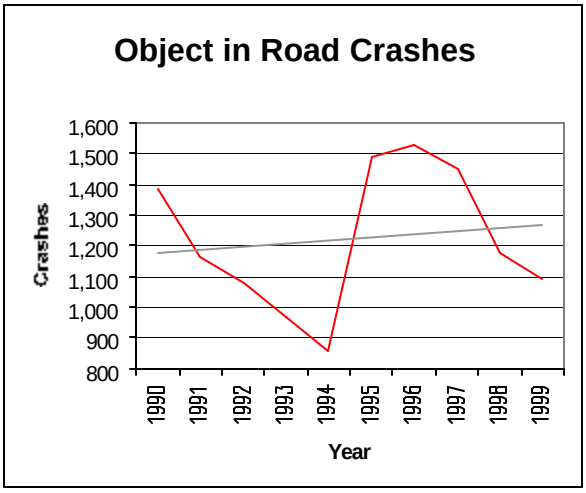
Moose crash activity has been segregated because its frequency has increased dramatically and because the severity of these crashes is much greater than that with other animals. Ten-year data is not presented because Moose, Deer and Bear crashes were not differentiated from crashes with other animals prior to 1995.

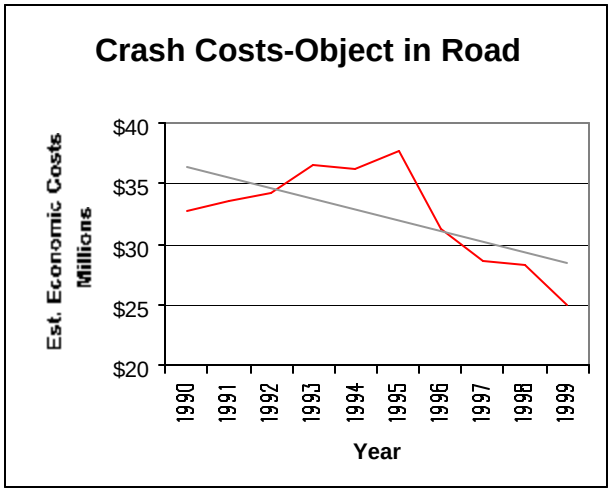
To date, a powerful video has been produced for use at Driver Education classes along with other public information and educational activities. A Moose Crash map has been developed to show the frequency of moose crashes throughout the state. This map is being widely distributed. A multi-agency task force, which includes MDOT, has conducted significant research and intends to implement pilot projects in 2001.



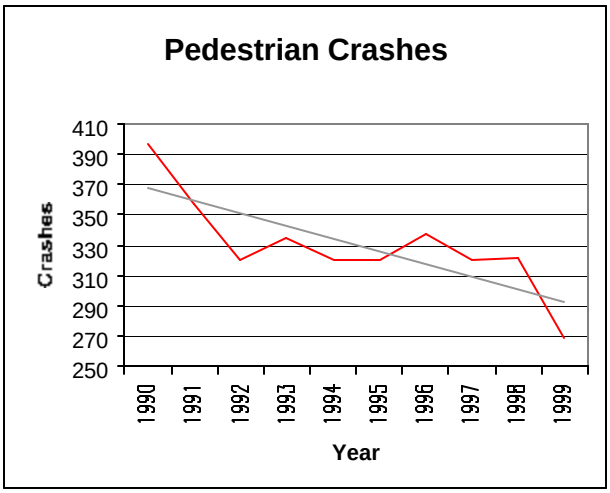


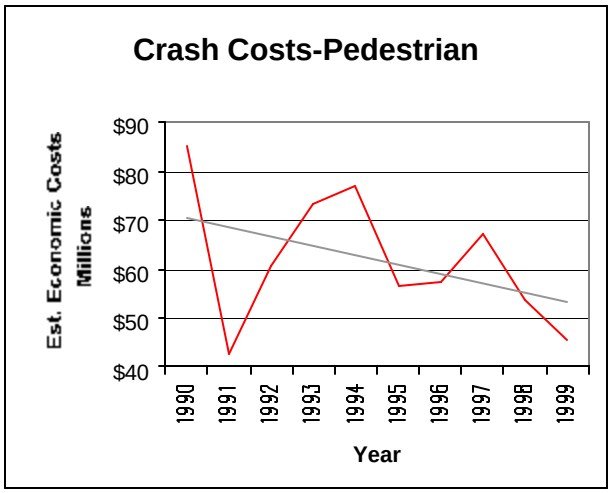
Head On crashes are a serious crash type in terms of injury and fatality potential. Based on ten-year Maine crash comparisons, there is about 1.5 times the chance of an injury in a Head-On crash than in an average crash, and 4.5 times the chance of the crash resulting in a fatality. The recent trend for the number of Head-On crashes is downward, following a peak in 1993, though the current level is only marginally lower from what it was in 1991. Despite overall number and cost of crashes declining, the estimated economic cost has shown an increasing trend since 1996. This may be due to increasing speeds and size differential between various vehicle types.



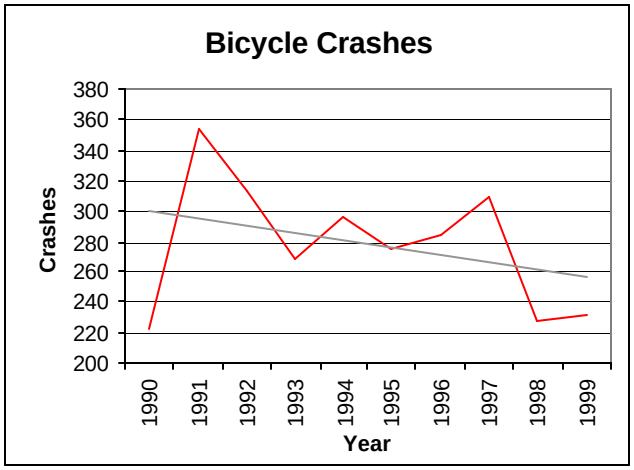


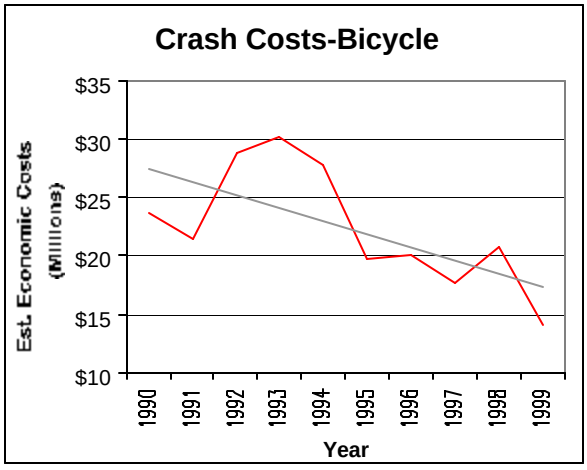
Object in Road crashes have moderated over the last few years and are now lower than the ten-year average. The number of crashes of this type and their economic impact peaked in 1995-1997. The trend has been steadily down since 1995.



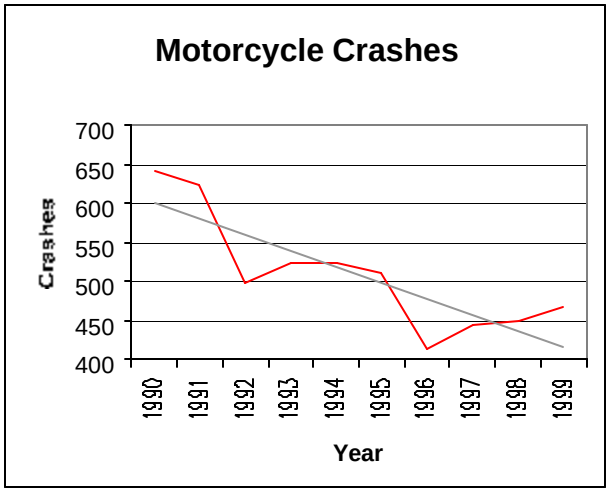


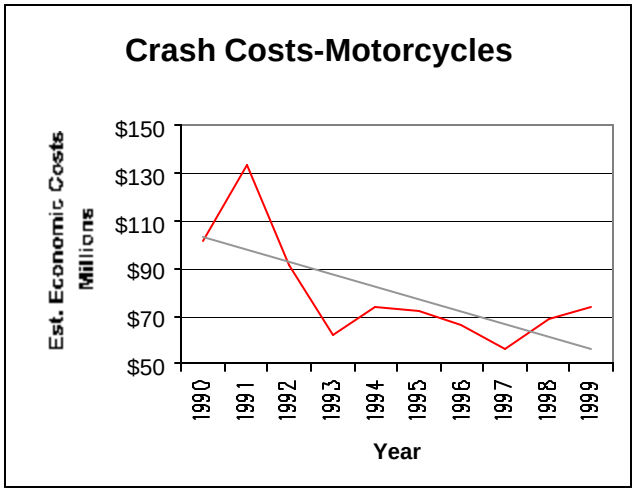
Pedestrian crashes have dropped during the last ten years. Crash costs have generally declined, but the annual economic costs, while also trending down, have been more variable. These costs have been more subject to swings based on the smaller number crashes and fluctuations in the severity of resulting injuries. Improved pedestrian reflective wear, education, high profile coverage in Brunswick, Harpswell, Norway and other communities and a reduction in alcohol related crashes (both for pedestrian and driver) are all attributable to this improvement. MDOT is currently involved in a study to identify pedestrian safety needs and to develop pedestrian crossing design standards. Additionally, the Maine Transportation Safety Coalition and others are holding “pedestrian safety road shows” across the state.



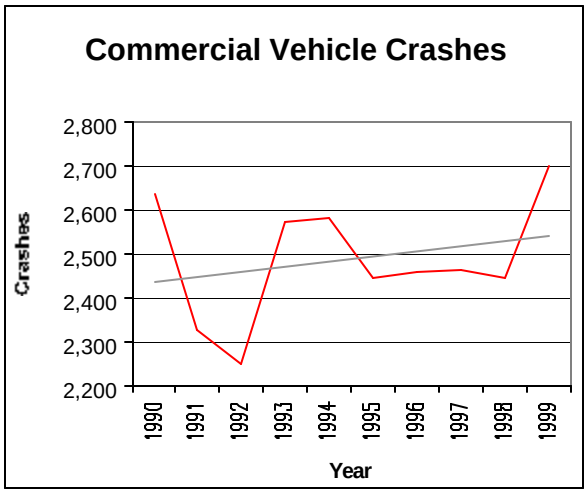


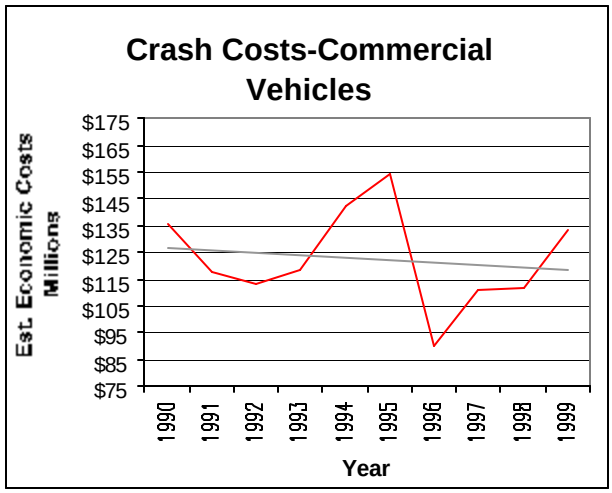
The number of bicycle crashes peaked in 1991 and has generally trended down since then. Trend for the estimated economic costs also is down. Bicycle safety education activities have increased in recent years, including a MDOT funded program for bicycle safety in Maine schools. Bicycle trails and lanes have also helped increase awareness and the overall safety of bicycling in Maine.



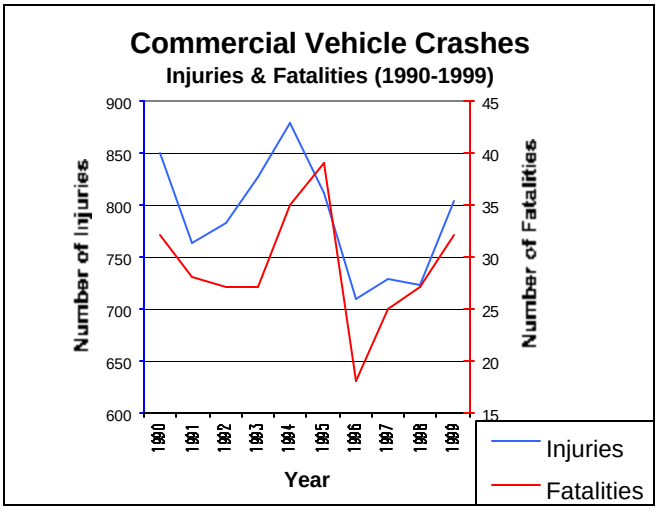


Motorcycle crashes showed a decreasing trend from 1990 until 1996, but the number of crashes has been gradually increasing over the most recent years. Fatality and injury trends have generally followed these crash patterns. Annually, an average of 18 people are killed and 530 injured in Maine motorcycle crashes.





After reaching a low of 2,187 Commercial Vehicle crashes in 1992, this category of crashes has increased to its current high of 2,598. The improving economy has most likely fed the increase of commercial traffic and resulting increase in crash experience. Estimated economic costs have been up and down, and overall, have trended slightly downward. Several federal and state initiatives are underway to address safety for commercial vehicles. These activities include a multi-agency work group involved with improving the quality of safety data for both intra- and interstate commercial vehicle carriers. The data will enable the limited resources to be directed more cost effectively.



Highway Safety Improvement Program

Maine's capital Highway Safety Improvement Program (HSIP) is partially funded by the Federal Highway Administration. Its purpose is to reduce the number and severity of crashes, and to decrease the potential for crashes to occur on all public roads. The program is structured to encompass planning, implementation and evaluation of safety programs and projects. The HSIP consists of two distinct program areas:

1. **The Hazard Elimination Program** (HEP) addresses road related hazards that exist on any public road.
2. **The Grade Crossing Improvement Program** (GCIP) addresses safety issues at railroad grade crossings at public roads.

In Maine, responsibility for the development of the HSIP has been assigned to the Safety Management Section (SMS) located in the Systems Management Division of the Bureau of Planning. The purpose of this report is to evaluate the effectiveness of the HSIP in a manner that will provide a better understanding of the benefits of the various capital improvement safety initiatives undertaken in Maine.

A summary of recently completed HSIP projects is provided on the following pages, with their three year pre- and post-construction crash statistics. In addition to those projects listed, a roundabout project was completed in Gorham in mid 1997. The pre- and post-construction crash summary of the Gorham project is:

	# of Crashes	**# of Injuries**	**Est. Crash Cost**
Pre-Roundabout (5/1/94-5/1/97)	17	5	$180,000
Post-Roundabout (7/1/97-7/1/2000)	9	1	$ 55,000

Maine Department of Transportation
Highway Safety Improvement Program
Summary of Projects Completed 1994-1996

Hazard Elimination Program

PIN	Town	Location	Constr. Completion Date	HSIP Cost	Total Project Cost	Work Description
5669.00	Bowdoin	Route 125 at Store St.	15-Jun-94	$695	$1,993	Flashing Beacon
5671.00	Nobleboro	Intersection of US 1 & East Pond Road	11-Aug-95	$206,522	$241,523	Construction of Eastbound left-turn lane
5665.00	Orono	Northbound I-95 off-ramp at Kelly Road	17-Jul-96	$277,751	$315,547	Relocation of Northbound off-ramp
2740.01	Rockport	Intersection of US 1 & State Route 90	09-May-94	$28,240	$34,970	Traffic Signal installation, signing and striping
5674.00	Sanford	US 202/Route 4 & Route 224	16-Oct-96	$222,674	$274,949	Intersection improvement with signal
5594.00	Warren	Intersection of Routes 90 & 131	27-Sep-95	$393,258	$446,804	Intersection improvements incl. channel, & left turn lanes
5667.00	Waterville	Routes 11/104/137 (Silver and Elm Streets)	10-May-95	$48,011	$54,205	Installation of traffic signals, signing and striping
5668.00	Waterville	First Rangeway & Western Ave.	15-Jun-94	$374	$604	Upgrading of flashing beacon
5148.00	Windham	Intersection of US 202/Route 4 & River Ro	12-Feb-94	$30,620	$34,119	Install traffic signals
			Subtotal	**$1,208,144**	**$1,404,714**	

Major Striping Projects (1)

5533.00	Various	Locations off the interstate system	1994	$1,879,000	$2,071,064	Striping
6257.00	Various	6870 Miles off the interstate system	1995	$1,279,641	$2,472,206	Striping
7043.00	Various	Non-interstate, off system	1996	$420,000	$490,838	Striping
			Subtotal	**$3,578,641**	**$5,034,108**	

Bridge & Superstructure (1)

5157.00	Poland-Minot	Hackett Mills Bridge	15-Nov-96	$452,169	$1,572,973	Superstructure replacement & approaches
			HEP Total	**$5,238,954**	**$8,011,795**	

Note: Beginning in 1998, all safety projects are selected based on Benefit-to-Cost ratio, except for guardrail improvements to the National Highway System (being required by FHWA).

Grade Crossing Improvement Program (2)

5677.00	Ashland	State Route 11	14-May-95	$29,959	$32,299	Update of Crossing Signals
5921.00	Auburn	Lewiston Junction Road	18-Oct-96	$33,126	$36,811	R/H Crossing Signal Installation/Rehab
5912.00	Brewer	U.S. Route 1A	5-Jun-95	$91,562	$101,821	R/H Crossing Rehab with Signal
1665.31	Brunswick-Topsham	By-pass, RR Bridge	10-May-96	$33,206	$576,278	Modification to existing Railroad bridge
3919.00	Carmel	Damascus Road	15-Oct-94	$69,925	$77,732	R/H Crossing reconstruction
5678.00	Fort Kent	State Route 161	17-Jun-96	$110,919	$114,484	Update crossing signals & rehabilitate RR crossi
5681.00	Lagrange	State Route 155	17-Jun-96	$27,775	$30,862	Signal Update
3928.00	Lincoln	Bagley Mountain Road	15-Oct-94	$104,897	$116,592	R/H Reconstruction & Install Auto warning device
3927.00	Lincoln	Sweet Road	15-Oct-94	$102,912	$114,386	R/H Reconstruction & Install Auto warning device
5906.00	Madawaska	Bridge Street Crossing	13-Oct-95	$76,456	$85,298	RR crossing rehabilitation & update signals
5914.00	Millinocket	Spruce Street	15-Oct-94	$46,023	$51,142	R/H Crossing Signal Installation/Rehab
5682.00	Milo, Route 11	State Route 11	17-Jun-96	$29,448	$32,720	Update crossing signals
5238.00	Newcastle	Main Street	05-Mar-96	$68,670	$76,362	Rehabilitation of RR Crossing & update flashing lights
5907.00	Oakfield	Spoffords Crossing	12-Oct-95	$75,117	$83,617	RR Crossing rehabilitation & update signals
3909.00	Old Orchard	Walnut Street	15-Jun-94	$31,317	$34,821	Rehab of automatic warning device
5915.00	Orrington	Route 15	3-Apr-95	$73,308	$81,576	R/H Crossing Rehab with Signal
5909.00	Presque Isle	Allen Street Crossing	29-Sep-95	$102,924	$114,431	RR crossing rehabilitation & update signals
5910.00	Presque Isle	North Street Crossing	29-Sep-95	$112,715	$125,239	RR crossing rehabilitation & update signals
5908.00	Presque Isle	Main Street Crossing	29-Sep-95	$145,847	$163,128	RR crossing rehabilitation
5343.00	Presque Isle	State Route 163	21-Nov-96	$137,961	$154,544	New R/H crossing with auto warning devices
5679.00	Stacyville	State Route 11	14-May-96	$51,024	$56,692	Update crossing signals
5685.00	T4 Indian Purchase	Spruce Street/Route 11	01-May-95	$68,446	$76,149	Rehabilitation of RR Crossing
5239.00	Waldoboro	State Route 32	27-Sep-95	$51,054	$56,954	Installation of flashing lights
3940.00	Winthrop	Main St.	15-Mar-94	$98,937	$109,929	Update automatic warning devices
5237.00	Wiscasset	US Route 1	15-Aug-94	$14,625	$16,312	Crossing rehabilitation
			GCIP Total	**$1,788,153**	**$2,520,179**	
			HSIP Grand Total	**$7,027,107**	**$10,531,974**	

(1) Striping and bridge projects no longer funded through the Hazard Elimination Program.
(2) No train crashes have occurred in the "3-year prior" nor in the "3-year after" period for the Grade Crossing Improvement Program projects. (Maine experiences only 9 train-vehicle crashes per year, on average.) Projects are selected based on potential for crashes to occur and crossing physical

Maine Department of Transportation
Highway Safety Improvement Program
Performance Evaluation of HEP Projects
1994-1996

					3-Year Pre-Construction Period							3-Year Post Construction Period							Project Effectiveness				
						Severity							Severity										
PIN	Town	Work Description	Constr. Compl t Date	Present Worth Annual Cost of Total Project (1)	Total Crashes	Fatalities	Incapacitating Injuries	Evident Injuries	Possible Injuries	Property Damage Only	Cost (2)	Total Crashes	Fatalities	Incapacitating Injuries	Evident Injuries	Possible Injuries	Property Damage Only	Cost (2)	3 Year Savings	Yearly Cost Savings	% Reduction Total Crashes	% Reduction Total Crash Cost	Final B/C Ratio
5669.00	Bowdoin	Flashing beacon	1994	$1,174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0	$0	0.00%	0.00%	0
5671.00	Nobleboro	Construction of eastbound left-turn lane	1995	$22,507	5	0	0	1	2	8	$92,000	2	0	0	0	1	3	$27,000	$65,000	$21,667	60.00%	70.65%	0.96
5665.00	Orono	Relocation of northbound off ramp	1996	$28,511	8	0	0	0	2	21	$70,000	11	0	1	0	1	28	$239,000	-$169,000	-$56,333	-37.50%	-241.43%	-1.98
5157.00	Poland-Minot	Superstructure replacement and approaches	1996	$115,275	21	0	3	7	13	45	$1,125,000	5	0	0	3	1	10	$143,000	$982,000	$327,333	76.19%	87.29%	2.84
2740.01	Rockport	Traffic signal installation, signing and striping	1994	$5,049	8	0	0	2	3	38	$106,000	14	0	0	2	5	36	$223,000	-$117,000	-$39,000	-75.00%	-110.38%	-7.72
5674.00	Sanford	Intersection improvement with signal	1996	$25,971	17	0	0	5	11	43	$455,000	17	0	0	1	8	29	$240,000	$215,000	$71,667	0.00%	47.25%	2.76
5594.00	Warren	Intersection improvement including channel, left turn lanes	1995	$39,954	10	1	0	6	5	20	$2,951,000	9	0	0	2	1	23	$125,000	$2,826,000	$942,000	10.00%	95.76%	23.58
5667.00	Waterville	signals, signing and striping	1995	$6,726	55	0	1	1	20	146	$890,000	12	0	0	0	4	34	$126,000	$764,000	$254,667	78.18%	85.84%	37.86
5668.00	Waterville	Upgrading of flashing beacon	1994	$1,053	16	0	1	0	7	39	$381,000	21	0	0	3	9	90	391,000	-$10,000	-$3,333	-31.25%	-2.62%	-3.17
5148.00	Windham	signals	1994	$5,417	28	0	0	7	8	80	$520,000	18	0	0	2	5	47	$239,000	$281,000	$93,667	35.71%	54.04%	17.29
		Totals		**$251,637**	**168**	**1**	**5**	**29**	**71**	**440**	**$6,590,000**	**109**	**0**	**1**	**13**	**35**	**300**	**$1,753,000**	**$4,837,000**	**$1,612,333**	**35.12%**	**73.40%**	**6.41**

(1) Present worth annualized cost of construction, based on FHWA estimated useful life of project, $0 salvage value and 6% interest rate (The 1996 Annual Report on Highway Safety Improvement Programs, U.S. Department of Transportation, Federal Highway Administration, April, 1996.)
(2) Based on FHWA Technical Advisory "Motor Vehicle Accident Costs" T 7570.2, October 31, 1994

MOOSE VEHICLE CRASH FACTS IN MAINE 1996-1998

	MOOSE	OTHER ANIMALS
NUMBER OF CRASHES	2,126	12,810
NUMBER OF CRASHES WITH INJURIES OR FATALITIES	494	478
NUMBER OF HUMAN FATALITIES	8	0
NUMBER OF HUMAN INJURIES	637	553
ESTIMATED ECONOMIC IMPACT	$50,189,000	$47,073,000
ESTIMATED INPACT PER CRASH	$23,600	$3,675

NOTE:

MAINE'S VEHICLE CRASH RATES FOR ALL ANIMAL TYPES, INCLUDING MOOSE, HAVE STEADILY INCREASED OVER THE PAST 10 YEARS, MORE THAN **DOUBLING** DURING THIS TIME PERIOD. THE NUMBERS ABOVE SHOW THE SERIOUSNESS OF STRIKING A MOOSE, WITH:

- A FAR HIGHER AVERAGE ECONOMIC IMPACT
- A ONE IN FOUR CHANCE THAT IN A CRASH THERE WILL BE RESULTING INJURY
- A POSSIBILITY OF VEHICLE OCCUPANT FATALITY

SOME DRIVING TIPS TO HELP KEEP YOU FROM BEING A STATISTIC:

- MOOSE CAN BE FOUND ANYWHERE IN THE STATE, SO BE ON THE LOOKOUT.
- BE ESPECIALLY WARY DURING DUSK AND EARLY NIGHTTIME HOURS WHEN MOOSE TEND TO MOVE MOST.
- WITH THEIR DARK BROWN COLOR, MOOSE ARE VERY DIFFICULT TO SEE AT NIGHT...REDUCE SPEED DURING HOURS OF DARKNESS TO PROVIDE AN EXTRA SAFETY CUSSION, ALLOWING YOU TO STOP IN A SHORTER DISTANCE.
- MAKE SURE YOU CAN SEE AN ADEQUATE DISTANCE AHEAD TO ALLOW YOU TO REACT TO SURPRISES ON THE ROAD

CRASHES INVOLVING MOOSE

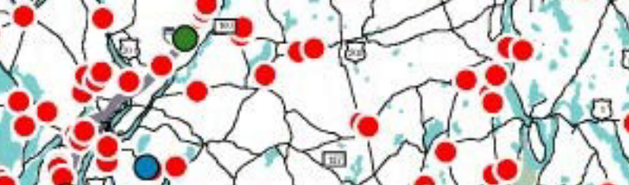
1996 -1998

MADAWASKA
FORT KENT
VAN BUREN
ASHLAND
HOULTON
JACKMAN
MEDWAY
GREENVILLE
CALAIS
RANGELEY
EASTPORT
BANGOR
RUMFORD
BAR HARBOR
ROCKLAND
FRYEBURG
PORTLAND
SANFORD
KITTERY

MAP LEGEND

- SINGLE CRASH
- TWO CRASHES
- THREE CRASHES
- FOUR CRASHES
- FIVE CRASHES
- HIGH CRASH RATE LOCATION
- TURNPIKE/INTERSTATE
- MAJOR HIGHWAYS

NOTE: NOT ALL PUBLIC ROADS ARE SHOWN ON THE MAP



MAINE CRASHES INVOLVING ANIMALS (1996-1998)

0 5 10 20 40 60 80 100
APPROX. SCALE IN KILOMETERS

0 5 10 20 40 60 80 100
APPROX. SCALE IN MILES

THE FOLLOWING AGENCIES ARE RESPONSIBLE FOR THE PRODUCTION OF THIS MAP

DEPARTMENT OF TRANSPORTATION
DEPARTMENT OF INLAND FISHERIES & WILDLIFE
OFFICE OF SECRETARY OF STATE
DEPARTMENT OF PUBLIC SAFETY
MAINE TURNPIKE AUTHORITY